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IMPLEMENTATION OF THE DECLARATION ON THE GRANTING OF INDEPENDENCE TO COLONIAL COUNTRIES AND PEOPLES BY THE SPECIALIZED AGENCIES AND THE INTERNATIONAL INSTITUTIONS ASSOCIATED WITH THE UNITED NATIONS

Report of the President of the Economic and Social Council on consultations held with the Chairman of the Special Committee on the Situation with regard to the Implementation of the Declaration on the Granting of Independence to Colonial Countries and Peoples and the Chairman of the Special Committee against Apartheid

SPECIAL COMMITTEE ON THE SITUATION WITH REGARD TO THE IMPLEMENTATION OF THE DECLARATION ON THE GRANTING OF INDEPENDENCE TO COLONIAL COUNTRIES AND PEOPLES

1. At its second regular session of 1989, the Economic and Social Council adopted resolution 1989/95 of 26 July 1989 on the implementation of the Declaration on the Granting of Independence to Colonial Countries and Peoples by the specialized agencies and the international institutions associated with the United Nations. In paragraph 14 of the resolution, the Council requested its President to continue to maintain close contact on these matters with the Chairman of the Special Committee on the Situation with regard to the Implementation of the Declaration on the Granting of Independence to Colonial Countries and Peoples and to report thereon to the Council.

2. At its forty-fourth session, the General Assembly adopted resolution 44/85 of 11 December 1989, in paragraph 17 of which it requested the Economic and Social Council to continue to consider, in consultation with the Special Committee, appropriate measures for the co-ordination of the policies and activities of the

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* E/1990/92.

specialized agencies and other organizations of the United Nations system in implementing the relevant resolutions of the General Assembly.

3. Taking into account the above-mentioned resolutions and in light of the attainment of independence of Namibia, the specialized agencies and international institutions associated with the United Nations should strengthen existing measures of support and formulate additional programmes of assistance to the remaining Trust and Non-Self-Governing Territories within the framework of their respective mandates. Most of the Trust and Non-Self-Governing Territories are islands, small in size and population and geographically isolated. Their location makes them vulnerable to natural disasters, such as hurricane Hugo in the Caribbean and hurricane Ofa in the Pacific, which have recently devastated some of the islands. These characteristics, together with the low level of economic development, make these Territories dependent on external assistance. The specialized agencies and other organizations of the United Nations system, as well as international and regional organizations, should be invited to examine and review conditions in each of the Territories, so as to take into account the pressing need for increased transfer of resources to the peoples concerned, and take appropriate measures within their respective spheres of competence in order to accelerate progress in the economic and social conditions of those Territories.

4. In accordance with the terms of Council resolution 1989/95, the President of the Council maintained close contact with the Chairman of the Special Committee during the period under review and, on the basis of those contacts and in light of the related developments, submits to the Council the observations set out below with a view to facilitating Council consideration of the present item.

5. During the year, members of the Council and the Special Committee followed closely their respective work relating to the item. The President considers it both useful and essential that such contacts and co-operation continue to be maintained with a view to mobilizing the maximum possible assistance beneficial to the peoples of the remaining Trust and Non-Self-Governing Territories.

6. According to the comprehensive information provided by specialized agencies and organizations of the United Nations system, as contained in the related report of the Secretary-General (A/45/309), during the period under review a number of specialized agencies and organizations have continued to extend assistance, in varying degrees in their respective spheres of competence, to the peoples of Trust and Non-Self-Governing Territories, in response to the relevant resolutions of the General Assembly, the Economic and Social Council and the Special Committee. The report also indicates that an increasing number of those organizations have extended or formulated such programmes of assistance from within their own budgetary resources, in addition to their respective contributions as executing agencies of projects funded by the United Nations Development Programme (UNDP), the primary provider of assistance.

7. A number of assistance projects have continued to be funded by UNDP in close collaboration with other agencies and organizations of the United Nations system. The Council President notes that the fourth cycle (1987-1991) indicative planning figures (IPFs) established for some of those Territories include the following:

Anguilla, $US 1,066,000; Bermuda, $694,000; British Virgin Islands, $239,000; Cayman Islands, $584,000; Montserrat, $676,000; St. Helena, $465,000; Tokelau, $1,151,000; Trust Territory of the Pacific Islands, $2,912,000; and Turks and Caicos Islands, $753,000. These projects cover assistance in the primary economic sectors, such as tourism, agriculture, fisheries, industry, transportation, communication and power generation, as well as in the social and educational sectors, and are being executed by a number of specialized agencies and other organizations of the United Nations system, in close co-operation, where appropriate, with the Caribbean Community (CARICOM). In December 1989, the Food and Agriculture Organization of the United Nations (FAO) embarked on advisory services for the establishment of fishing industries in the Trust Territory of the Pacific Islands.

8. In the aftermath of hurricane Hugo, which devastated five countries of the Caribbean region in September 1989, FAO dispatched a special mission to the area, where, according to its findings, the British Virgin Islands sustained damages amounting to $1.3 million and Montserrat, $5.8 million. Up to 32 and 35 per cent, respectively, of fisheries, the primary economic activity in the two Territories, were severely damaged. On the basis of the mission report, FAO provided emergency assistance to the British Virgin Islands amounting to $599,250 and to Montserrat, $4,559,850, over and above the existing allocations. UNDP also provided $400,000 from the Special Programme Resources to assist members of the Organization of Eastern Caribbean States, including the British Virgin Islands and Montserrat.

9. The Council President draws attention to the extremely fragile economies of these small island Territories and stresses the continuing critical needs of their people. While noting with appreciation the increased assistance being rendered to them, the President appeals to the specialized agencies and other organizations concerned to focus their renewed attention on the remaining Trust and Non-Self-Governing Territories so as to expand and increase their assistance programmes to them. The Council President is particularly mindful of the pressing need for external assistance of a number of small dependent Territories for which no IPF had yet been established. The need for assistance to those Territories in ensuring the advancement of their inhabitants in political, economic, social and educational areas is extremely acute.

10. Renewed efforts must be made to secure an increased flow of funds required for the preparation of the programmes of assistance and, in particular, for the support of the major funding institutions within the United Nations system. Bearing in mind the need for maximum flexibility, those institutions should take steps to remove any existing constraints or difficulties so as to ensure the availability of the added resources required. The role of the executive heads of the institutions concerned is of special importance. In keeping with paragraph 9 of General Assembly resolution 44/85 and paragraph 12 of Economic and Social Council resolution 1989/95, the executive heads should formulate concrete proposals for consideration by the respective governing and legislative organs. At the same time, the agencies and organizations that have in large measure depended on extrabudgetary sources for financing of assistance projects should continue to endeavour to find ways and means of including or increasing provision in their regular budgets for initiating and for expanding projects beneficial to the peoples concerned.

11. The Council President welcomes the continued initiative exercised by UNDP in maintaining close liaison among the specialized agencies and other organizations of the United Nations system, and in co-ordinating the activities of the agencies in extending effective assistance to the peoples of colonial Territories. The active participation of the representatives of the Governments of Trust and Non-Self-Governing Territories at the relevant meetings and conferences of the agencies and organizations have invariably contributed to the positive consideration given by the organizations concerned to measures in support of colonial peoples. The President is convinced that this practice must be encouraged so that the Territories may draw the maximum possible benefits through active participation in the related activities of the specialized agencies and other organizations of the United Nations system. The close contacts have not only facilitated further increases in the volume and scope of assistance provided by the specialized agencies and organizations of the United Nations system but also have enhanced the ability of agencies to respond more quickly and with greater flexibility to needs, as they are identified. In order to make maximum use of the available resources, the agencies and organizations should take further steps to strengthen the existing measures and explore additional ways and means of co-ordination, as they are essential to ensure the effectiveness of assistance projects and other activities of the various agencies.

12. In respect of Namibia, first and foremost, the President of the Council notes with deep satisfaction the historic accession to independence of Namibia and extends his heartfelt felicitations to the Government and people of Namibia for their accomplishments.

13. As regards assistance to Namibia from the specialized agencies and the international institutions associated with the United Nations, the President notes that all assistance projects that were in progress before 1 April 1989 have been completed or are in the process of being completed. He further notes that development assistance for the South West Africa People's Organization was transferred to technical assistance for Namibia in early 1989. Only two projects benefiting children are still in progress and will be continued until the end of 1990 in order to allow the authorities of an independent Namibia to arrange for the resettlement of the children.

14. During the period under review, the President notes that in 1988/89 some 1,700 Namibians benefited from the various training opportunities made available in 23 different countries, under the United Nations Fund for Namibia. The President notes with appreciation the entry into force, in September 1989, of the UNDP Trust Fund for Namibia with an initial contribution of $1,733,682 for the purpose of providing a mechanism for bilateral, multilateral and private aid organizations to support technical and capital assistance projects in priority areas during Namibia's transition period and immediately after independence.

15. Following the establishment of the Trust Fund for Namibia, UNDP continued the orderly winding down of projects of which Namibians were the beneficiaries in order to complete the transfer of the unused balances to the UNDP resources available for funding of the technical assistance programme in Namibia. An allocation of $10.6 million was also provided by UNDP for emergency assistance to

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Namibia covering the next two years. The President also notes that an "Independence bonus" of over $2 million will be available to Namibia, in accordance with the established procedure approved by the UNDP Governing Council. Likewise, the World Health Organization (WHO) has drawn up a provisional budget of $26 million for assistance to Namibia for the first 18 to 24 months after independence, which provides for 30 international volunteers, and renovation and rehabilitation of health facilities, training and equipment. It is noted that the United Nations Children's Fund has organized immunization and related health activities, has enabled women farmers to resume food production activities with seeds and tools, has joined a team helping with curriculum development, sponsored jointly by the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the Government of Sweden, and has supplied school materials.

16. Furthe r, the International Labour Organisation (ILO) dispatched an exploratory mission to Namibia in September 1989 to assess the framework and identify priority areas for a comprehensive ILO technical co-operation programme to assist an independent Namibia. It also stationed, as from April 1990, a workers' education adviser at Windhoek to work closely with the National Union of Namibian Workers and its affiliated unions in order to identify both their short- and long-term education needs, as well as to prepare a detailed project proposal for long-term assistance. It is also noted that the International Monetary Fund dispatched in April/May 1989 a technical assistance mission to Windhoek to help with preparation for the establishment of a central bank and to give advice on related matters. The Fund is currently preparing a comprehensive technical assistance programme aimed at strengthening Namibia's capacity for economic management as well as manpower training.

17. The President of the Council notes with deep appreciation the conclusion of the pre-independence Namibian repatriation exercise, successfully carried out by the United Nations High Commissioner for Refugees (UNHCR), entailing the return of a total of 43,387 Namibian refugees of whom 35,553 were from Angola, 3,841 from Zambia and 3,993 from 40 other countries.

18. As regards further assistance to the newly independent Republic of Namibia, the President notes the appeal made by its Prime Minister to the international community at the donors' consultation meeting, held at United Nations Headquarters on 24 April 1990. In this connection, the President welcomes the Namibia Donors' Pledging Conference for Namibia to be held at United Nations Headquarters on 21 and 22 June 1990, and earnestly hopes that the specialized agencies and the international institutions associated with the United Nations as well as the international community as a whole will take that opportunity to generously respond to the Prime Minister's appeal.

19. Subject to any directives that the General Assembly might give at its forty-fifth session and in conformity with such decisions as might be taken by the Council, the President of the Council shall continue to maintain close contact with the Chairmen of the two Special Committees on matters raised in the present report.

SPECIAL COMMITTEE AGAINST APARTHEID

20. The President of the Economic and Social Council and the Chairman of the Special Committee against Apartheid held consultations regarding the recent developments in South Africa and actions taken by the international community during the last 12 months.

21. The Chairman reviewed the decisions taken by the General Assembly during its forty-fourth session. In resolution 44/27 A, the Assembly called for assistance to the struggling people of South Africa, their national liberation movements and South African refugees, particularly women and children. In resolution 44/27 C, the Assembly urged the Security Council to consider the application of comprehensive and mandatory sanctions against South Africa as long as it continued to disregard the demands of the majority of the people of South Africa and of the international community to eradicate apartheid. In resolution 44/27 D, the Assembly urged all States that had not yet done so, pending the imposition of comprehensive and mandatory sanctions, to adopt legislative and/or comparable measures to impose effective sanctions against South Africa in a number of areas and requested the Secretary-General to prepare a report to the General Assembly at its forty-fifth session on measures to monitor sanctions undertaken by the United Nations system, Governments and non-governmental agencies. In resolution 44/27 E, the Assembly called upon all Governments, intergovernmental and non-governmental organizations to induce banks and other financial institutions to deny and/or restrict bank loans and trade credits, and to impose stricter conditions on trade financing. In resolution 44/27 G, the Assembly authorized the Special Committee, acting as a focal point for the international action against apartheid, to continue to monitor closely the situation in South Africa and to mobilize international action against apartheid. In resolution 44/27 H, the Assembly urged the Security Council to impose a mandatory embargo on oil and petroleum products as well as the supply of equipment and technology and also requested all States concerned to adopt effective measures to ensure the complete cessation of the supply of oil and petroleum products to South Africa. In resolution 44/27 I, the Assembly urged the Security Council to consider immediate steps to ensure the full implementation of the arms embargo against South Africa. In resolution 44/27 K, the Assembly, by consensus, called for concerted international action for the elimination of apartheid by demanding that the South African authorities release all political prisoners, immediately lift the state of emergency, abrogate discriminatory laws and initiate a political dialogue with genuine leaders of the majority of the population of South Africa with a view to establishing a representative government.

22. The Chairman of the Special Committee reviewed with the President of the Council the elements of the Declaration on Apartheid and its Destructive Consequences in Southern Africa, 1/ which was adopted by consensus by the General Assembly during its sixteenth special session, held in December 1989. The Declaration, which called for the establishment of a non-racial and democratic society in South Africa through genuine negotiations, outlined fundamental principles that would be of importance to a new constitutional order to be determined by the people of South Africa, the process of negotiations leading towards the desired objectives, the steps the Government of South Africa should take to create the necessary climate for such negotiations as well as the

responsibility of the international community in support of this process and objective. In this context all Member States pledged, inter alia, that they would use concerted and effective measures, including the full observance by all countries of the mandatory arms embargo, aimed at applying pressure to ensure a speedy end to apartheid, and that they would not relax existing measures aimed at encouraging the South African régime to eradicate apartheid until there was clear evidence of profound and irreversible changes, bearing in mind the objectives of the Declaration.

23. The Chairman of the Special Committee informed the President of the Economic and Social Council that action so far taken by the South African authorities represented a step in the right direction. However, they should be followed by others, inter alia, the release of all political prisoners, the lifting of the state of emergency and the abrogation of all security laws designed to circumscribe political activities in South Africa in order to create the necessary climate conducive to negotiations.

24. Considering the progress that had been made in the matter of the independence of Namibia and a number of significant developments in South Africa, the Chairman of the Special Committee and the President of the Council discussed forward-looking strategies to be pursued in cases of profound and irreversible changes in South Africa and the total dismantling of the system of apartheid. The international community must be able to properly respond to a post-apartheid era and should provide assistance to liberation movements, including possible compensation to the black majority. However, the Chairman emphasized that at the moment there should be no relaxation of sanctions and that the measures so far adopted by the South African authorities were far from being considered sufficient for reconsideration of the present sanctions.

Notes

1/ Official Records of the General Assembly, Sixteenth Special Session, Supplement No. 1 (A/S-16/4), annex.

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DEVELOPMENT AND INTERNATIONAL ECONOMIC CO-OPERATION: DEVELOPMENT OF THE ENERGY RESOURCES OF DEVELOPING COUNTRIES

ECONOMIC AND SOCIAL COUNCIL
Second regular session of 1990
DEVELOPMENT AND INTERNATIONAL ECONOMIC CO-OPERATION: DEVELOPMENT OF THE ENERGY RESOURCES OF DEVELOPING COUNTRIES

Energy exploration and development trends in developing countries

Report of the Secretary-General

SUMMARY

In paragraph 5 of its resolution 43/193 of 20 December 1988, the General Assembly requested the Secretary-General to continue to undertake appropriate studies and analyses of trends in energy exploration and development of energy resources in developing countries, and in paragraph 3 of the same resolution it requested the Secretary-General to outline a programme of action aimed at the acceleration of the exploration and development of the energy resources of developing countries.

The present report analyses trends in energy consumption and production in developing countries during the past two decades and focuses on prospects to the year 2010 with particular reference to the energy-deficient developing countries.

In view of expected continued growth in population and industrialization, economic growth in the developing countries will be accompanied by relatively high rates of increase in demand for energy. Exploration and development of indigenous energy resources, as well as their transformation into energy products, will require considerable investments, which can be met only by mobilization of financing from the national public and private sectors, promotion of direct

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investments from transnational energy corporations, reactivation of lending from the world capital markets and expansion of bilateral and multilateral assistance programmes.

Since rural areas of the developing world have only limited access to modern energy technologies and supplies and since more than half of the people live in those areas, new initiatives will be necessary to augment traditional energy sources and improve their utilization through more efficient technologies, integrated energy strategies and integrated rural development programmes. This will require new political, social, economic and environmental policy orientations and assistance from both national and international sources.

Among the oil-importing developing countries, only about a quarter of them have some domestic oil production. The rest depend entirely on imports for their requirements. Higher oil prices caused considerable hardship to those countries before 1986. Since then, their oil import bills have again resumed an upward trend because of increases in demand and stagnation in the production of indigenous oil. While no comprehensive data is available, it is estimated that oil import bills have increased to $30 billion in 1989 as compared to $20 billion in 1986.

On the optimistic assumption of continued stability in oil prices to the year 2010, as well as a constant ratio of dependence on oil imports, oil import bills will rise to $80 billion (in constant 1989 United States dollars) per annum at the end of the period. However, under this assumption production of domestic oil will need to rise by 160 per cent. Unless the downward trend in exploration and development efforts is reversed, this is not likely to happen and, consequently, oil import bills will be even higher. The ability of these countries to finance such bills is doubtful, and economic growth may once again be stalled.

The report concludes with an outline of a programme of action whose purpose is to accelerate exploration and development of indigenous energy resources in the developing countries, focusing on measures and policies that are required at the national level. It also indicates the need for co-operation among the developing countries and the opportunities for bilateral and multilateral contributions.

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I. TRENDS AND PROSPECTS IN ENERGY CONSUMPTION

1. In the developing world, patterns of energy consumption reflect a variety of factors such as levels of economic development and structures of agriculture, industry and other sectors of the economy. The distribution of population between urban and rural areas is significant; urban areas are the centre of commercial energy consumption such as oil and gas, while rural areas depend mostly on traditional sources of energy such as biomass, fuelwood and have little access to centralized energy systems, including electricity. For that reason, statistics on energy consumption in developing countries need to be interpreted with caution because they often refer only to commercial sources and exclude traditional sources, the magnitude of which is difficult to quantify.

2. Nevertheless, developing countries show a number of similarities in energy consumption patterns. Despite higher rates of growth, levels of energy consumption remain very low. Per capita energy consumption in the developing countries is only 11 per cent of that in the developed market economies. In many countries in Africa and Latin America energy consumption is actually declining.

3. Scarcity of capital and modern energy technologies hamper the development of indigenous energy resources even when their potential is well known (e.g., hydropower). Those scarcities are even more important when exploring for indigenous sources such as oil and gas, the existence of which can only be surmised until more capital is devoted to their discovery and development. For those reasons, developing countries have remained dependent on foreign sources of capital, technologies and expertise for the exploration and development of their energy resources. Yet, several developing countries have been able to establish and strengthen national oil companies of considerable size with activities in all sectors of the oil and gas industries. In some cases these activities have extended to foreign countries as well. Similarly, in the electricity sector, public utilities have expanded programmes involving massive investments, often with financial assistance from bilateral and multilateral sources. However, only a handful of developing countries have been able to establish their own industries for the production of energy equipment and supplies.

4. The reason developing countries in general have failed to adjust to the higher energy prices of the past two decades is mainly that scarcities of capital and modern technologies are also basic constraints to energy efficiency and conservation. As a result, income elasticities of energy demand have remained much higher than in the developed market economies with the implication that the resumption of economic growth in the developing world is bound to be accompanied by considerable increases in energy consumption. Improved efficiency will be required on both the supply and the demand sides of the energy picture. In particular, the capital intensity of electrification programmes calls for rehabilitation of existing plants and the reduction of losses in transmission and distribution networks, which could save billions of dollars in additional investments. But more needs to be done with energy end-use equipment, including cooking stoves in rural and urban areas as well as automobiles, trucks, tractors, refrigerators, lighting and the like.

A. Past trends

5. As shown in table 1, consumption of commercial primary energy in the developing countries during the period 1974 to 1988 grew at 5.5 per cent per annum as compared to 3.1 per cent in Eastern Europe and the Union of Soviet Socialist Republics and 0.5 per cent in the developed market economies.

6. With a population of over 3,900 million, developing countries consumed 1,728 million tons of oil equivalent (toe) in 1988, about 25 per cent of the world total. Per capita consumption was only 443 kilograms of oil equivalent as compared to 4,330 kilograms in the developed market economies (see table 2).

7. Coal remains the most important commercial energy source in the developing world as a whole (see table 3). However, it is dominant only in China and India, which together account for half of the population in the developing countries and 80 per cent of coal consumption.

8. Oil is by far the most important energy source in other developing countries, accounting for 100 per cent of commercial energy consumption in 45 developing countries and territories. 1/ The average annual growth in oil consumption has been considerably higher in developing countries than in the developed market economies.

9. Increases in oil consumption were particularly high during the 1970s in the oil-exporting developing countries because of rapid economic growth based on high oil export revenues and low or subsidized prices of petroleum products for national consumption. After some deceleration in the annual growth during the period 1980-1985, increases in oil consumption in those countries since the oil price collapse of 1986 have been minimal. Oil export revenues and the growth of gross domestic product have stagnated and prices for petroleum products have been raised by increases in excise taxes.

10. In the oil-importing developing countries, oil consumption during the 1970s also grew at an annual rate of 6 per cent, but it decelerated to negative 0.7 per cent per annum during the period 1980-1985 owing to economic recession and higher energy prices. Since 1986, however, their oil consumption growth has again accelerated to 5.4 per cent per annum.

11. During the 1980s, overall oil consumption in the developed market economies has declined and 1988 levels were 4 per cent lower than in 1980. In Eastern Europe and the Soviet Union, consumption levels remained static. In the developing countries, however, oil consumption increased by 23.2 per cent. This was due to strong growth in aviation fuels and motor gasoline and a lack of alternatives for electricity generation (for example, nuclear power or coal) in many developing countries, which continued to rely on heavy fuel oil-fired power plants unlike the developed market economies where heavy fuel oil consumption was reduced by 47 per cent.

Table 1. Consumption of commercial primary energy a/

(Million tons of oil equivalent)

		1970	1980	1985	1986	1987	1988
Developed market economies	Oil	1 432.0	1 665.3	1 493.0	1 524.8	1 535.6	1 596.1
	Gas	659.6	765.2	741.8	711.4	740.0	748.9
	Coal	718.4	784.2	880.8	856.8	888.1	915.4
	Electricity	77.9	142.1	200.7	209.6	217.6	228.0
	Total	2 887.9	3 356.8	3 316.3	3 302.6	3 381.3	3 488.4
Eastern Europe and the USSR	Oil	271.1	465.7	437.0	447.3	457.9	466.4
	Gas	192.2	385.6	548.3	575.8	618.2	616.9
	Coal	518.1	589.2	600.3	615.5	619.1	663.9
	Electricity	12.1	25.0	38.2	38.1	41.7	45.4
	Total	993.5	1 465.5	1 623.8	1 676.7	1 736.9	1 792.6
All developing countries	Oil	267.1	554.5	611.5	629.9	646.5	683.2
	Gas	49.6	131.9	182.0	201.9	227.4	245.0
	Coal	270.5	463.2	644.7	680.2	710.6	729.8
	Electricity	16.8	42.4	60.5	63.4	66.5	69.6
	Total	604.0	1 192.0	1 498.7	1 575.4	1 651.0	1 727.6
Member countries of OPEC	Oil	37.6	110.6	150.0	148.3	146.3	152.4
	Gas	24.2	57.6	81.4	98.0	105.4	117.4
	Coal	1.0	1.6	2.6	3.4	4.1	3.7
	Electricity	0.8	2.4	3.6	3.8	4.0	4.1
	Total	63.6	172.2	237.6	253.5	259.8	277.6
Other oil-exporting countries	Oil	70.0	163.6	192.1	198.6	208.8	215.6
	Gas	16.8	50.0	59.6	58.8	63.2	64.9
	Coal	179.8	310.3	427.7	449.2	468.0	476.6
	Electricity	4.9	10.3	15.2	15.2	15.6	16.7
	Total	271.5	534.2	694.6	721.8	755.6	773.8
Oil-importing countries	Oil	159.5	280.3	269.4	283.0	291.4	315.2
	Gas	16.8	50.0	59.6	58.8	63.2	64.9
	Coal	179.8	310.3	427.7	449.2	468.0	476.6
	Electricity	4.9	10.3	15.2	15.2	15.6	16.7
	Total	271.5	534.2	694.6	721.8	755.6	773.8
Total world	Oil	1 970.2	2 685.5	2 541.5	2 602.0	2 640.0	2 745.7
	Gas	901.4	1 282.7	1 472.1	1 489.1	1 585.6	1 610.8
	Coal	1 507.0	1 836.6	2 125.8	2 152.5	2 217.8	2 309.1
	Electricity	106.8	209.5	299.4	311.1	325.8	343.0
	Total	4 485.4	6 014.3	6 438.8	6 554.7	6 769.2	7 008.6

Source: Department of International Economic and Social Affairs of the United Nations Secretariat, based on the Energy Statistics Yearbook, various issues.

a/ Data on oil consumption refer to "apparent consumption", which is an indication of actual gross inland availability. They do not include air and sea bunkers or non-energy products from refineries.

Table 2. Per capita consumption of commercial primary energy
(Kilograms per capita of oil equivalent)

	1970	1980	1985	1988
Developed market economies	4 107	4 408	4 225	4 330
Eastern Europe and the USSR	2 871	3 909	4 179	4 480
Developing countries	228	360	407	443
World total	1 213	1 351	1 327	1 371

Source: Department of International Economic and Social Affairs of the United Nations Secretariat, based on the Energy Statistics Yearbook, various issues; and Prospects of World Urbanization, 1988 (United Nations publication, Sales No. E.89.XIII.8).

Table 3. Composition of commercial primary energy consumption by source
(Percentage)

		1970	1980	1985	1986	1987	1988
Developed market economies	Oil	49.6	49.6	45.0	6.2	45.4	45.8
	Gas	22.8	22.8	22.4	21.5	21.9	21.5
	Coal	24.9	23.4	26.6	25.9	26.3	26.2
	Electricity	2.7	4.2	6.1	6.3	6.4	6.5
Eastern Europe and the USSR	Oil	27.3	31.8	26.9	26.7	26.4	26.0
	Gas	19.3	26.3	33.8	34.3	35.6	34.4
	Coal	52.1	40.2	37.0	36.7	35.6	37.0
	Electricity	1.2	1.7	2.4	2.3	2.4	2.5
All developing countries	Oil	44.2	46.5	40.8	40.0	39.2	39.5
	Gas	8.2	11.1	12.1	12.8	13.8	14.2
	Coal	44.8	38.9	43.0	43.2	43.0	42.2
	Electricity	2.8	3.6	4.0	4.0	4.0	4.0
Member countries of OPEC	Oil	59.1	64.2	63.1	58.5	56.3	54.9
	Gas	38.1	33.4	34.3	38.7	40.6	42.3
	Coal	1.6	0.9	1.1	1.3	1.6	1.3
	Electricity	1.3	1.4	1.5	1.5	1.5	1.5
Other oil-exporting countries	Oil	25.8	30.6	27.7	27.5	27.6	27.9
	Gas	6.2	9.4	8.6	8.1	8.4	8.4
	Coal	66.2	58.1	61.6	62.2	61.0	476.6
	Electricity	4.9	10.3	15.2	15.2	15.9	61.6
Oil-importing countries	Oil	59.3	57.7	47.6	47.2	45.8	46.6
	Gas	3.2	5.0	7.2	7.5	9.3	9.3
	Coal	33.4	31.2	37.8	37.9	37.5	36.9
	Electricity	4.1	6.1	7.4	7.4	7.4	7.2
Total world	Oil	43.9	44.7	39.5	39.7	39.0	39.2
	Gas	20.1	21.3	22.9	22.7	23.4	23.0
	Coal	33.6	30.5	33.0	32.8	32.8	32.9
	Electricity	33.6	30.5	33.0	32.8	32.8	32.9

Source: Department of International Economic and Social Affairs of the United Nations Secretariat, based on the Energy Statistics Yearbook, various issues.

12. Natural gas in 1988 accounted for 14 per cent of overall commercial energy demand in developing countries, as compared to 42 per cent in Eastern Europe and the Soviet Union and 22 per cent in the developed market economies. In the relatively mature markets of the member countries of the Organization of the Petroleum Exporting Countries (OPEC), the share was 42 per cent, whereas in the other oil-exporting and oil-importing developing countries it was only 8.4 and 9.3 per cent, respectively. Out of 112 oil-importing developing countries, natural gas consumption was registered in only 15 countries. 2/

13. The annual rate of growth in electricity consumption has been consistently strong even though in many developing countries shortages have caused serious damage to economic output 3/ and more than half of the population, mostly in rural areas, have no access to electricity at all.

14. In the developing countries, new and renewable sources of energy provide about 30 per cent of the total energy consumption, with Africa at 57 per cent, Latin America at 33 per cent and the Asia and the Pacific region at 22 per cent. In rural areas alone, the contribution of new and renwable sources of energy is much higher (see A/AC.218/15).

B. Future trends and prospects

15. The amount of energy required to produce a given unit of economic output (measured in barrels of oil equivalent used per $1,000 of real GDP) is an indication of the intensity of energy use. Trends of energy intensity reflect the level of economic development, the structure of the economy, existing technologies and the energy mix.

16. Long-term analysis of the relationship between energy demand and economic growth in all countries leads to the following conclusions: at a lower level of economic development, the amount of energy used to produce each unit of output is generally low and tends to rise as the economy heads towards industrialization. However, at an advanced stage of industrialization, there is a tendency for growth in energy intensity to slow down as more energy efficient technology becomes available.

17. As shown in table 4, trends of energy intensity in all regions conform to this pattern. Between 1970 and 1987, energy intensity in the developed market economies declined by 28 per cent from 3.68 barrels of oil equivalent per $1,000 of real GDP (boe/$1,000) to 2.65 boe/$1,000. Similarly, in Eastern Europe and the Soviet Union it dropped from 10.02 to 8.39 boe/$1,000 during the same period. However, in the developing countries it increased from 3 boe/$1,000 in 1970 to 3.88 boe/$1,000 in 1987.

Table 4. Energy intensity

(Barrels of oil equivalent per $1,000 GDP)

	1970	1980	1985	1986	1987
Developed market economies	3.68	3.15	2.76	2.68	2.65
Eastern Europe and the USSR	10.02	8.95	8.40	8.32	8.39
All developing countries	2.99	3.47	3.79	3.85	3.88
Member countries of OPEC	1.31	1.95	2.80	3.09	3.09
Other oil-exporting countries	5.14	6.02	5.78	5.78	5.78
Oil-importing countries	2.57	2.87	2.89	2.89	2.93
World	4.13	3.82	3.60	3.55	3.55

Source: Department of International Economic and Social Affairs of the United Nations Secretariat, based on the Energy Statistics Yearbook, various issues; and National Accounts Database of the United Nations Statistical Office.

18. Forecasting world energy consumption, particularly over the longer term, is fraught with uncertainties. There is a wide range of opinion on future trends of energy consumption depending on different assumptions on a number of factors, including the rate of economic growth, oil price levels, improvement in energy efficiency and attitudes towards nuclear power and other environmental considerations. But there is a crucial need to discuss policy and strategy issues and map out in advance alternative courses in order to avert potential crises at both the national and international levels.

19. The projections of energy demand made in this report are subject to great uncertainties. They are intended to provide a plausible global framework of possible developments of energy trends in which to consider strategies as those developments affect developing countries.

20. Table 5 shows the baseline scenario of energy demand by fuel type to the year 2010 as derived from assumptions of constant energy prices in real terms, different rates of economic growth in the various groups of countries and past trends characterizing energy/economy links. 4/

21. World energy consumption is expected to grow by about 80 per cent during the period 1988-2010, at an average annual rate of 2.8 per cent. The developing world accounts for half of that increase. As a result, its share of world energy consumption would increase to 35 per cent by the year 2010 as compared to 25 per cent in 1988.

Table 5. Estimated future consumption of commercial primary energy

(Million tons of oil equivalent)

		1988	1995	2000	2010	Annual growth (Percentage)
Developed market economies	Oil	1 596	1 653	1 775	2 048	1.2
	Gas	749	857	923	1 070	1.6
	Coal	915	995	1 086	1 294	1.8
	Electricity	228	354	451	686	5.2
	Total	3 488	3 859	4 235	5 098	1.8
Eastern Europe and the USSR	Oil	466	558	654	603	3.0
	Gas	617	833	941	1 188	2.9
	Coal	664	705	765	899	1.6
	Electricity	45	58	114	273	8.5
	Total	1 793	2 154	2 474	2 963	2.8
All developing countries	Oil	683	899	1 124	1 759	4.4
	Gas	245	342	427	678	4.8
	Coal	730	966	1 163	1 686	3.8
	Electricity	70	140	197	353	7.5
	Total	1 728	2 347	2 910	4 476	4.4
Member countries of OPEC	Oil	152	193	237	357	4.0
	Gas	117	155	177	231	3.1
	Coal	4	6	7	10	4.3
	Electricity	4	17	20	18	7.0
	Total	278	370	441	615	3.7
Other oil-exporting countries	Oil	216	291	356	536	4.2
	Gas	65	92	116	186	4.9
	Coal	477	629	751	1 072	3.8
	Electricity	17	33	50	103	8.5
	Total	774	1 044	1 274	1 897	4.2
Oil-importing countries	Oil	315	416	531	867	4.7
	Gas	63	96	134	261	6.7
	Coal	250	331	404	604	4.1
	Electricity	49	90	126	233	7.3
	Total	676	933	1 196	1 964	5.0
Total world	Oil	2 746	3 110	3 553	4 410	2.5
	Gas	1 611	2 032	2 291	2 936	2.7
	Coal	2 309	2 666	3 014	3 879	2.5
	Electricity	343	552	762	1 312	6.3
	Total	7 009	8 360	9 619	12 537	2.8

Source: Department of International Economic and Social Affairs of the United Nations Secretariat.

22. Annual growth rates of consumption of oil, gas and coal in developing countries are estimated at between 3.8 and 4.8 per cent. Primary electricity growth, however, would be much higher, at 7.5 per cent per annum.

23. Oil will continue to dominate commercial energy consumption in the developing world. Coal will retain its overall position and it will be of great importance, especially in China and India. Natural gas, although registering a faster growth rate than either oil or coal, will strengthen its position as the third most important fuel but will be more widely used. With limited nuclear power expansion, the growth in primary electricity consumption will consist mostly of hydropower.

II. TRENDS IN ENERGY EXPLORATION AND PRODUCTION

24. Perceptions have changed since the previous report of the Secretary-General (A/43/476 and Corr.1), in which energy exploration and development trends in crude oil, natural gas, coal, primary electricity and new and renewable sources of energy were analysed on the basis of data for the first half of the 1980s, including the immediate consequences of the oil price collapse and the Chernobyl nuclear accident of 1986.

25. It was emphasized in that report that lower oil prices had led to a world-wide slump in investments in petroleum exploration and development because of lower profit expectations and a drastic reduction in the cashflows of private oil corporations and national petroleum companies. The indebtedness of many developing countries had accentuated that problem since the drop in direct foreign investments had been accompanied by the closing of doors to world capital markets.

26. Investments were further reduced by the financial failure of hundreds of independent oil corporations that had grown and prospered during the 1970s and the first half of the 1980s in North America, the North Sea and elsewhere because of the high oil prices and profitability prevailing then. The reserves and other assets of such corporations were purchased by the major oil and other financially secure corporations, which, in turn, have undertaken a series of mergers and consolidations, as well as a general withdrawal from non-energy business and a reduction of activities aimed at the development of alternative energy sources such as coal, nuclear power, and new and renewable sources of energy.

27. In the past two years, continued increases in energy demand, particularly in oil, have rapidly closed the gap between available production capacities and requirements. Nevertheless, there has been no significant revival of investments in the main oil-producing areas. As a result, oil production has dropped significantly in the United States, with expectations of further declines in that country as well as in Canada and the United Kingdom sector of the North Sea.

28. Under those circumstances, an increase in demand of OPEC oil of 37 per cent in the second half of the 1980s has already led to an urgent need for new investments in production capacities in order to avoid possible shortages and upward pressures on prices. 5/

29. Prospects for limited energy capacities are not confined to crude oil production. They extend to oil transportation facilities and even to refineries in certain regions. In the field of electric power generation, increasing environmental concerns and uncertainties have led to closures and postponements of plans for new capacities, particularly those based on nuclear power.

A. Crude oil

30. As shown in table 6, crude oil production has increased by 6.54 million barrels per day (mbd) or 12.3 per cent during the period 1985-1989. Over 90 per cent or 6.0 mbd of this was due to expanded output from OPEC. Other oil-exporting developing countries increased their production by 1.1 mbd. During the same period, there was hardly any increase in the oil-importing developing countries or in Eastern Europe and the Soviet Union, while in the member countries of the Organisation for Economic Co-operation and Development (OECD), oil production dropped by 0.92 mbd or 6.4 per cent.

31. Among the OPEC countries, the largest increases were accounted for by the Middle East producers, especially Iraq, Kuwait, Saudi Arabia and the United Arab Emirates. In view of the magnitude of the proved reserves in these countries, much of the incremental demand for OPEC oil is expected to be supplied from the Middle East, with small additional contributions from Nigeria and Venezuela (see table 7).

32. In other oil-exporting developing countries, the rapid expansion of oil production during the first half of the 1980s decelerated significantly in the second half, mainly because of slowdowns in China and Mexico, the biggest producers in this group.

33. The proved reserves of the non-OPEC oil-exporting developing countries are limited except in Mexico, and production levels in the near future are not expected to change substantially even though new discoveries have recently been made in a few countries such as Yemen and the Syrian Arab Republic. More importantly, the rapid growth in domestic oil consumption in many of these countries is expected to result in lower exports.

34. After oil production in the oil-importing developing countries increased by 75 per cent in the first half of the 1980s, reaching a level of 1.9 mbd in 1985, mainly because of sizeable increases in Brazil and India, it levelled off in the second half of the decade despite promising discoveries in Pakistan, Democratic Yemen and Viet Nam. With very limited proved oil reserves and substantial slowdowns in exploration and development in oil-importing developing countries, further improvements are threatened since investments have been severely cut back because of budget constraints and foreign debt problems. Furthermore, rapidly increasing domestic demand for oil will result in higher oil import bills, which may become more oppressive with gradually rising oil prices.

Table 6. World production of oil, gas and coal

(Oil: Million barrels per day)

(Gas: Million cubic metres per day)

(Coal: Thousand metric tons per day)

		1970	1980	1985	1986	1987	1988	1989
Developed market economies	Oil	11.2	12.6	14.4	14.3	14.2	14.2	13.4
	Gas	2 185.5	2 320.8	2 135.1	2 063.9	2 151.5	2 241.2	2 307.7
	Coal	2 699.6	3 173.4	3 569.3	3 645.4	3 719.2	3 725.4	n.a.
Eastern Europe and the USSR	Oil	7.4	12.4	12.2	12.6	12.8	12.9	12.5
	Gas	627.9	1 346.5	1 902.8	2 022.9	2 152.3	2 255.5	2 361.2
	Coal	1 679.5	1 988.3	1 983.0	2 032.5	2 052.5	2 270.8	n.a.
All developing countries	Oil	26.8	34.5	26.6	29.1	28.8	31.1	33.8
	Gas	165.6	481.8	631.5	648.7	805.4	972.9	1 090.0
	Coal	1 327.6	2 178.5	3 105.0	3 216.9	3 360.1	3 438.8	n.a.
Member countries of OPEC	Oil	23.3	26.7	16.1	18.4	17.6	19.7	22.1
	Gas	74.2	229.4	275.8	331.0	427.6	498.7	626.2
	Coal	2.2	3.9	9.3	11.1	9.2	11.5	n.a.
Other oil-exporting countries	Oil	2.7	6.7	8.6	8.8	9.3	9.5	9.7
	Gas	52.8	181.8	233.9	187.7	230.2	292.9	286.8
	Coal	984.9	1 666.1	2 441.9	2 507.6	2 613.6	2 665.7	n.a.
Oil-importing countries	Oil	0.9	1.1	1.9	2.0	1.9	1.9	2.0
	Gas	38.6	70.6	121.8	130.1	147.6	181.3	185.1
	Coal	340.5	506.5	653.9	698.2	737.4	761.6	n.a.
Total world	Oil	45.5	59.4	53.2	56.0	55.8	58.1	59.7
	Gas	2 979.0	4 149.1	4 669.4	4 735.5	5 109.1	5 469.6	5 766.9
	Coal	5 706.7	7 340.3	8 657.2	8 894.8	9 131.8	9 435.0	n.a.

Source: Department of International Economic and Social Affairs of the United Nations Secretariat, based on the Energy Statistics Yearbook, various issues; and Oil and Gas Journal, 13 March 1989 and 19 March 1990.

n.a. = not available.

Table 7. World estimated proved oil, gas and coal reserves

(Oil: Billion barrels)

(Gas: Trillion cubic feet)

(Coal: Billion tons)

		1980	1985	1989
Developed market economies	Oil	58.8	60.1	52.2
	Gas	451.5	520.4	504.5
	Coal	n.a.	n.a.	226.7 a/
Eastern Europe and the USSR	Oil	70.0	65.0	60.1
	Gas	910.0	1 466.5	1 528.0
	Coal	n.a.	n.a.	240.0 a/
Developing countries	Oil	512.5	572.9	888.8
	Gas	1 188.4	1 270.5	1 970.3
	Coal	n.a.	n.a.	113.7 a/
OPEC member countries	Oil	435.6	476.3	767.1
	Gas	974.3	975.2	1 620.2
Other oil-exporting countries	Oil	69.9	86.9	104.6
	Gas	153.1	218.0	240.7
Oil-importing countries	Oil	7.0	9.8	17.1
	Gas	61.0	77.3	109.4
World total	Oil	641.3	698.1	1 001.1
	Gas	2 549.9	3 257.4	4 002.8
		n.a.	n.a.	580.4

Source: Department of International Economic and Social Affairs of the United Nations Secretariat, based on Oil and Gas Journal, various issues; and International Energy Agency, Coal Information 1988 (Paris, 1988), P. I. 82.

a/ Proved accessible coal reserves at end-1988; includes bituminous and anthracite, sub-bituminous coal, brown coal, lignite.

35. Of the 112 developing countries and territories that are currently importers of oil, only 22 produce some of their requirements from indigenous oil resources. The remaining countries have no domestic oil production at all. Moreover, 90 per cent of the oil produced in those countries as a whole came from Argentina, Brazil and India. Smaller producers (for example, Democratic Yemen, Chile, Pakistan, Thailand, Turkey) accounted for the remaining 10 per cent.

36. Exploration activities intensified world wide during the late 1970s and early 1980s, but in spite of the higher exploration success ratio, particularly in the developing countries, they began to subside after 1982, following the decline in oil prices. State-owned national oil companies in developing countries played a major role in the upsurge of exploratory drilling. Nearly 50 per cent of the exploratory wells were drilled by national oil firms and the other 50 per cent by international, independent and state-owned foreign oil companies.

37. The period following the oil price collapse in 1986 has exacerbated the situation and resulted in a precipitous decline in investments for exploration and development world wide. However, this reflects not only the impact of lower oil prices but also the adverse effect of other factors, including reduced investment capabilities of many national oil companies, cutbacks of international bank lending, and more stringent conditions for bilateral and multilateral loans.

38. Data on oil exploration and development indicate that drilling activities are still heavily concentrated in mature oil-producing countries and suggest that there is a strong correlation between drilling activity, economic growth and indebtedness. For example, there is an upward trend in drilling activity in India, Malaysia and Thailand, but a downward trend in Argentina, Brazil, Colombia, Peru, Trinidad and Tobago, and Venezuela.

39. A breakdown of oil exploration and development activities in developing countries is shown in table 8. The number of exploratory and development wells fell in all groups of developing countries during the period 1986 to 1988 as compared to the period 1983 to 1985, but more so in OPEC member countries where exploratory drilling dropped by over 40 per cent and development drilling by 44 per cent.

40. In other oil-exporting developing countries, exploratory drilling declined by 8.7 per cent and development drilling by 25.7 per cent.

41. In the oil-importing developing countries, the number of exploratory wells fell by 15.6 per cent and development wells increased by 3.2 per cent. However, more than 97 per cent of exploration and development activities in the oil-importing developing countries has taken place in those countries with some oil production, especially in Argentina, Brazil, India, Pakistan, Thailand, Turkey and Yugoslavia.

42. Exploration activities in the non-oil producing developing countries continued to be low. In 80 other non-oil producing developing countries and territories no exploration activities had been carried out at all.

Table 8. Exploration and development indicators in developing countries (1983-1988)

	Seismic activity (line-km)		Percentage change	Exploratory drilling (no.)		Percentage change	Development drilling (no.)		Percentage change
	1983-1985	1986-1988		1988-1985	1986-1988		1983-1985	1986-1988	
Developing countries	1 324 418	1 497 124	+ 13.0	4 766	3 784	- 20.6	15 242	12 346	- 19.0
OPEC member countries	346 663	291 684	- 15.9	1 286	767	- 40.4	4 833	2 709	- 43.9
Non-OPEC oil-exporting countries	360 357	367 291	+ 1.9	1 156	1 056	- 8.7	3 827	2 843	- 25.7
Oil-importing countries	617 398	838 149	+ 35.8	2 324	1 961	- 15.6	6 582	6 794	+ 3.2
Oil-producing countries	509 117	742 937	+ 45.9	2 234	1 907	- 14.6	6 565	6 770	+ 3.1
Non-oil producing countries	108 281	95 212	- 12.1	90	54	- 40.0	17	24	+ 41.2

Source: Department of International Economic and Social Affairs of the United Nations Secretariat, based on Petroconsultants (United Kingdom) Ltd., World Petroleum Trends, various issues.

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B. Natural gas

43. The position of the developing countries with regard to gas is not as strong as in oil, although they possess almost half of the world's proved reserves. It is also believed that vast resources remain to be discovered. In the past, exploration avoided gas-prone areas in those areas since geological success could rarely be followed by commercialization given the absence of markets, and the high costs of the infrastructure restrained the development of this versatile fuel.

44. Where conditions were favourable, as in North America, western Europe and the Soviet Union, massive natural gas networks have been established for household consumption, production of petrochemicals and fertilizers and, increasingly, for electricity generation.

45. Advances in the manufacture of large diameter pipes and the construction of continental and intercontinental pipelines have facilitated the transport of natural gas to distant markets. The past 25 years have also seen the rise of extensive trade in liquefied natural gas (LNG), which requires investments in processing plants at the source, specialized LNG carriers for transportation at sea and regassification facilities in importing countries.

46. Growing demand for natural gas in the developed market economies has led to exports of LNG from Algeria to western and southern Europe and from Brunei Darussalam, Indonesia and Malaysia to Japan. Similar projects are planned from other developing countries (for example, Nigeria, Qatar, Trinidad and Tobago and Venezuela) for exports to the same regions as well as to the United States.

47. In the developing countries themselves, there has been considerable increase in gas production. In addition to OPEC countries, natural gas networks of considerable size have grown in Argentina, India and Pakistan and several other developing countries have similar plans. In several cases, gas is being promoted as a substitute for oil in order to augment oil export capacities (for example, in Egypt, the Syrian Arab Republic, Indonesia and Nigeria).

C. Coal

48. Coal reserves are less widely spread in the developing countries than other primary energy resources. Most reserves are found in China and India and in a few other developing countries such as Botswana, Colombia, Indonesia, Venezuela and Zimbabwe. In all they possess only 20 per cent of the world total. Many other deposits are of low quality, often situated in inhospitable areas and far away from markets.

49. In China and in India, coal production has doubled in the past 20 years and is expected to expand considerably in the future. More modest increases in production are expected in a few other developing countries. However, expectations of sizeable imports of coal into developing countries for electric power generation, with some exceptions (for example, Republic of Korea, Taiwan Province of China), have not materialized mainly because of lack of infrastructures.

D. Electric power

50. The role of electricity has been increasing throughout the world, reflecting its versatility in uses in many economic sectors. During the period 1970-1988, electricity production in the developing countries increased by 350 per cent. Thermal sources accounted for 65 per cent of electricity production in 1988, hydropower 32 per cent, nuclear 2.5 per cent and geothermal 0.3 per cent. 6/ Because of indigenous reserves, coal-fired plants are particularly significant in China and India as well as in a few other developing countries.

51. Most of the developing countries, however, depend on oil, often imported, and on indigenous gas and hydropower for their electric power generation.

52. Developing countries accounted for 49 per cent of incremental electricity production in the world based on hydropower during the period 1970-1988. Still, only a small part of the hydropower potential of the developing countries has been exploited because of lack of markets and a variety of other factors, including the lack of capital and regional co-operation. As estimated by the World Energy Conference, 7/ the hydropower potertial is vast. At 10.8 billion barrels of oil equivalent, it accounts for about 54 per cent of the world total and is almost equal to all the oil production in the developing world in 1988.

53. As of the end of 1989, nuclear power plants were in operation in seven developing countries (Argentina (two), Brazil (one), India (seven), Republic of Korea (nine), Mexico (one), Pakistan (one), Yugoslavia (one) and Taiwan Province of China (six)). New plants were under construction in Argentina (one), Brazil (one), China (three), Cuba (two), India (seven), Iran, Islamic Republic of (two), Republic of Korea (two) and Mexico (one). 8/

III. OUTLINE OF A PROGRAMME OF ACTION FOR THE ACCELERATION OF ENERGY EXPLORATION AND DEVELOPMENT IN DEVELOPING COUNTRIES

54. The following suggestions for an outline of a programme of action aimed at the acceleration of energy exploration and development in the developing countries, as requested by the General Assembly in its resolution 43/193, are based on the reports already submitted, 9/ and the update included in the present report. They have a time horizon of 20 years since energy projects require considerable leadtimes, including the time required to find and develop oilfields or construct new electric power plants on the supply side and, similarly, the years required for the spread of efficient technologies in energy end-uses (e.g. automobiles, cookstoves) on the demand side.

55. In view of the existing differences among countries in the developing world with regard to levels of economic and social development and to energy resources endowment, priorities for further action need to be established at the national level. However, such priorities may be modified to take into account new understandings and agreements that may be reached at the intergovernmental level in view of the growing environmental concerns, which often transcend national boundaries.

56. An extrapolation of trends during the past 20 years, which assumes no fundamental restructuring of the world economy, shows that per capita income and energy consumption in the developing countries, which are low now, will be completely inadequate by the year 2010. Per capita energy consumption in the developing countries will remain at about 13 per cent of that in the developed market economies.

57. For a variety of technical and economic reasons, only about a quarter of the oil in place in developing countries is in fact produced. The application of modern methods and techniques in enhanced oil recovery, including the newly developed technique of horizontal drilling, could improve recovery factors considerably. Recent examples of the application of those techniques in some developing countries are encouraging but their full application will probably require new arrangements between host Governments and transnational oil corporations as well as expanded co-operation between producing and consuming countries. With the rapidly closing gap between existing oil production capacities and the demand for oil from oil-exporting developing countries, similar co-operation may be required to expand capacities through the provision of capital and expertise, particularly with regard to security of investments and markets. Special consideration and novel arrangements involving bilateral and multilateral sources of assistance may be necessary for the same purpose in oil-importing developing countries.

58. There is much uncertainty as to the magnitude and geographic distribution of potential oil resources. On the basis of past exploration experience, expert geologists believe that much of the potential is to be found in the developing countries, mostly in OPEC and other oil-exporting developing countries, but also in areas, both onshore and offshore, in the oil-importing developing countries where exploration efforts have so far been inadequate.

59. Exploration technologies have been advancing at a fast rate in recent years, including three-dimensional seismic surveys and the intensive application of computers for the gathering and interpretation of massive quantities of data. New exploration theories, including geochemical and other surveys, are more extensively applied. Oil discoveries have thus been made where prior technologies and theories had failed.

60. The search for oil is a dynamic process that requires the training and retraining of personnel and the application of new technologies. It requires a long-term commitment of risk capital. In other words, it requires resources that are scarce in the developing world. Yet, scarcity and risk pertain to other economic activities as well and appropriate choices are required. Furthermore, oil exploration is done in steps with pre-drilling surveys being the least costly. Only when probabilities of discovery are high, do drilling funds need to be committed.

61. Geological departments in the developing countries have the task of evaluating the potential resources in their respective countries. They need to be supported and strengthened. Similarly, national oil companies have been set up in most of

the developing countries, in many cases with the task of exploring indigenous oil resources. In a number of cases they have been successful, sometimes spectacularly so. Recent criticism as to their efficiency refers more to the problems of management of public enterprises and inappropriate interference of Governments, than to the nature of the institutions themselves. They should be reformed and enabled to carry out their objectives either alone or in association with private sector domestic and foreign oil companies on the basis of priorities established at the national level.

62. In recent years, many developing countries have revised the terms and conditions of petroleum laws and agreements for long-term exploration and development in order to attract more foreign capital through direct investments. Generally, the response has been positive but its magnitude has not been commensurate with the needs of the developing world, particularly in the oil-importing developing countries. The reasons are complex and relate to the perceptions of potential investors of political stability, as well as geologic prospectivity in the context of the international oil market, oil price volatility as well as competitive opportunities in the developed market economies and, more recently, in Eastern Europe and the Soviet Union.

63. Developing countries wishing to attract foreign capital will have to continue a close monitoring of terms and conditions elsewhere in order to compete effectively by introducing much more flexibility and effective administration. In this context, jurisdictional disputes among States in promising areas, which have hampered exploration, should be resolved through negotiation on the basis of successful agreements elsewhere.

64. Pricing policies for crude oil produced indigenously in oil-importing developing countries are often a crucial issue if, as is often the case, that oil is required for national consumption. Its price level should be competitive in order to attract capital investment, whether local or foreign.

65. Financing of oil exploration and development, apart from foreign capital, has been obtained through budgetary allocations. In some cases more permanent financing has been derived from special funds set up with part of the excise taxes on petroleum products allocated for this purpose. A more wide-spread use of such financing mechanisms should be explored further.

66. National geological surveys and oil companies need to expand and intensify their evaluation of oil potential and exploration, particularly in oil-importing developing countries, in order to identify projects for investments. In the past they have received valuable assitance from bilateral and multilateral sources and from the United Nations system for this purpose. In addition, technical co-operation among developing countries has expanded considerably. All these programmes should be encouraged to continue and to increase their activities. Programmes such as those of Petro-Canada International Assistance Corporation 10/ and Japan National Oil Corporation, 11/ which have been providing assistance on a grant basis, could be emulated by other donor countries. The assistance programme for energy exploration and development in 12 Latin American and Caribbean

countries, through favourable oil prices and loans provided by the joint San Jose Accord of Mexico and Venezuela, 12/ could be emulated in other regions in the developing world, with particular focus on the least developed countries. The United Nations Revolving Fund for Natural Resources Exploration could be requested to examine the feasibility of carrying out geological and geophysical surveys in developing countries.

67. Since natural gas is often produced in association with oil from the same reservoirs much of what has been suggested above applies to this fuel as well. However, natural gas development is particularly capital intensive and more bilateral and multilateral financial assistance will be required for projects aimed at domestic consumption and exports. The World Bank, the International Development Association and the International Finance Corporation have an important role in this regard.

68. Recently, exploration and development agreements have been revised in some developing countries by the introduction of natural gas clauses in order to encourage investments by foreign oil companies with positive results. 13/ More effort in this direction is required.

69. With higher oil prices and surplus capacities in coal-exporting countries, the competitive position of coal for electric power generation in developing countries may improve considerably, which will require large capital investments. Recent examples of B.O.T (build-operate-transfer) schemes, by which exporters of coal and electric power plant contractors from developed countries supply the necessary finance in exchange for operating the plant until investments are recovered and then transferred it to the host country, require further consideration. Because of environmental problems associated with the use of coal, modern clean-up technologies at all levels of mining, transport and utilization should also be considered.

70. Rapid increases in demand for electricity in developing countries will require massive investments for new capacities. In the past, the financing of such investments received priority because Governments promoted the expansion of the use of electricity both as a contributor to economic development and as a direct means of raising living standards. Both bilateral and multilateral sources of financial assistance were active in this sector and world capital markets provided considerable loans.

71. Electricity tariffs in many developing countries have not been high enough to generate sufficient capital to add adequate new capacities. Attempts in some countries to raise them in recent years, during a period of recession, have led to political tensions.

72. Future policies should aim at an increase in the efficiency of electric power generation through the rehabilitation of existing plants and reductions in transmission and distribution losses, which are often double those in other countries. Similarly, studies performed by some developing countries have shown that electric power consumption could be reduced by as much as 30 per cent through

rigorous conservation and efficiency improvement in end-use devices. Programmes aimed at the attainment of this objective should be promoted.

73. Electricity tariffs could be adjusted more easily during periods of economic growth with the aim of enabling public utilities to become more self-sufficient in their financing needs for additional capacity. In this context, special consideration may be given to expanded rural electrification programmes as a means of more equitable distribution of income and promoting more balanced economic and social development. At the same time, bilateral and multilateral sources of financial assistance should expand their activities, perhaps in the context of global environmental considerations. In this respect, special consideration may be given to the financing of the development of the vast hydropower potential of the developing countries. Large hydropower sites may be developed and interconnected through regional and inter-regional co-operation to meet the increasing demand for electricity in the developing countries and for export to developed market economies. Small hydropower sites could be developed for local and rural areas.

74. In the area of new and renewable sources of energy, in addition to hydropower, new and improved energy technologies should be applied after careful consideration of their competitiveness, particularly in rural areas. Developing countries will require assistance in establishing and strengthening applied research and development centres in that field. Because of considerable advances in some areas by a few developing countries, co-operation with other developing countries could be encouraged and promoted. Similarly, private sector involvement could be appropriate in a variety of new and renewable sources of energy.

75. Efficiency and conservation in the production of energy should also be accompanied by similar programmes in energy end-uses through appropriate pricing policies and fiscal measures and through public education campaigns. In this regard, much more information on energy balances is required, and national surveys should be promoted, where necessary with assistance from bilateral and multilateral sources.

76. The principal elements of the suggestions for a programme of action for the acceleration of energy exploration and development in developing countries are summarized below:

(a) Oil and gas:

(i) Improving oil production rates of producing reserves through the application of secondary and enhanced recovery methods and techniques; conservation of associated gas through reinjection;

(ii) Encouraging oil and gas exploration and development through provision of risk capital; application of modern technologies; revisions of petroleum laws and terms and conditions of exploration and development agreements, including the introduction of natural gas clauses in such laws and agreements; institutional reform and strengthening of national geological surveys and national oil and gas companies; oil and natural gas pricing

policies; consideration of special petroleum exploration and development funds with financing from excise taxes on petroleum products; evaluation of potential oil and gas resources in order to attract additional investments with assistance from the United Nations system, bilateral and multilateral sources;

(b) Coal:

(i) Application of improved methods and technologies in mining, transportation and utilization;

(ii) Promotion of modern clean-up technologies to minimize adverse environmental effects;

(c) Electricity:

(i) Improving electric power generation efficiency;

(ii) Promoting reductions in transmission and distribution losses;

(iii) Adjusting electricity tariffs to provide for financing of additional electricity capacities;

(iv) Promoting the accelerated development of hydropower resources in the context of global environmental concerns;

(v) Application of special measures for the expansion of rural electrification programmes;

(d) New and renewable sources of energy: promotion of mature technologies in new and renewable sources of energy, with particular consideration of rural areas, including special measures in the context of global environmental concerns; 14/

(e) Efficiency in energy end-uses: adoption of policies and measures, including education campaigns for the promotion of efficiency in energy end-uses.

Notes

1/ Antigua and Barbuda, Aruba, Bahamas, Belize, Bermuda, British Virgin Islands, Burkina Faso, Cape Verde, Cayman Islands, Chad, Comoros, Cook Islands, Democratic Yemen, Djibouti, Equatorial Guinea, French Guiana, Gambia, Greenland, Grenada, Guadeloupe, Guam, Guinea-Bissau, Guyana, Kiribati, Maldives, Martinique, Montserrat, Nauru, Netherlands Antilles, Niue, St. Helena and dependents, Saint Kitts and Nevis, Saint Lucia, Saint Pierre and Miquelon, Senegal, Seychelles, Sierra Leone, Solomon Islands, Somalia, Tonga, United States Virgin Islands, Vanuatu, Wake Island, Western Sahara and Yemen.

2/ Afghanistan, Argentina, Bangladesh, Barbados, Brazil, Chile, Cuba, India, Republic of Korea, Morocco, Myanmar, Pakistan, Rwanda, Thailand and Turkey.

Notes (continued)

3/ World Economic Survey 1989 (United Nations publication, Sales No. E.89.II.C.1), p. 105.

4/ In the baseline scenario, crude oil prices (in constant 1989 United States dollars) are assumed to remain constant at $18 per barrel throughout the projection period. The annual rate of economic growth is estimated to average 3.1 per cent for the developed market economies, 3.1 per cent for Eastern Europe and the Soviet Union, 4.2 per cent for OPEC member countries, 3.9 per cent for other oil-exporting developing countries and 4.7 per cent for the oil-importing developing countries.

5/ United Nations, World Economic Survey 1990, chap. V.

6/ United Nations, Energy Statistics Yearbook, various issues.

7/ World Energy Conference, 1989 Survey of Energy Resources.

8/ International Atomic Energy Agency, Press Release, PR 90/7, 18 April 1990.

9/ See E/1983/91, A/38/512, A/39/420 and Corr.1, A/40/511 and Corr.1, A/40/637, A/41/383-E/1986/101, and A/43/476 and Corr.1.

10/ PCIAC was established in 1981 by the Canadian Government as a subsidiary of Petro-Canada, the national oil company, in order to undertake exploration, drilling and training programmes to help developing countries to identify and exploit their oil and gas resources in order to reduce their dependence on imported hydrocarbons and to stimulate private sector involvement in the commercial exploitation of these non-renewable resources. The Parliamentary appropriation of C$67.4 million in 1987/88 was spent on exploratory drilling (39.6 per cent), seismic surveys (34.6 per cent), technical assistance (22.4 per cent) and efficiency enhancement projects (3.4 per cent) in 30 countries and territories.

11/ JNOC was established in 1967 in order to assist Japanese companies to explore and develop oil and gas both in Japan and abroad. Since 1980, JNOC has undertaken geological and geophysical surveys in nine developing countries at an annual cost of about $20 million.

12/ Mexico and Venezuela have been co-partners since 1980 in the Acuerdo de San Jose (San Jose Accord), under which the two countries supply oil to Central American and Caribbean countries for their national consumption at 70 per cent of the world price, with the remaining 30 per cent left as a loan at a favourable rate of interest. This 30 per cent carries an even more favourable rate of interest if it is used for the development of indigenous energy resources in the receiving country.

Notes (continued)

13/ United Nations Centre on Transnational Corporations Advisory Studies, Series B, No. 1, Natural Gas Clauses in Petroleum Agreements, (United Nations publication, Sales No. E.87.II.A.3).

14/ New and renewable sources of energy are fully covered in the Nairobi Programme of Action for the Development and Utilization of New and Renewable Sources of Energy. See Report of the United Nations Conference on New and Renewable Sources of Energy, Nairobi, 10-21 August 1981 (United Nations publication, Sales No. E.81.I.24), chap. I, sect. A.

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Forty-fifth session
Item 82 (f) of the preliminary list*
DEVELOPMENT AND INTERNATIONAL ECONOMIC CO-OPERATION: DEVELOPMENT OF THE ENERGY RESOURCES OF DEVELOPING COUNTRIES

ECONOMIC AND SOCIAL COUNCIL
Second regular session of 1990
DEVELOPMENT AND INTERNATIONAL ECONOMIC CO-OPERATION: DEVELOPMENT OF THE ENERGY RESOURCES OF DEVELOPING COUNTRIES

Energy exploration and development trends in developing countries

Report of the Secretary-General

Corrigendum

1. Page 4, paragraph 2, last sentence

The sentence should read

In many countries in Africa and Latin America per capita energy consumption is actually declining.

2. Page 6, table 1

Replace the table by the attached.

3. Page 7, table 2

Replace the table by the attached.

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* A/45/50.

4. Page 21, paragraph 69, second sentence

The sentence should read

Recent examples of B.O.T. (built-operate-transfer) schemes, by which exporters of coal and electric power plant contractors from developed countries supply the necessary finance in exchange for operating the plan until investments are recovered and then transferred to the host country, require further consideration.

Table 1. Consumption of commercial primary energy a/

(Million tons of oil equivalent)

		1970	1980	1985	1986	1987	1988
Developed market economies	Oil	1 432.0	1 665.3	1 493.0	1 524.8	1 535.6	1 596.1
	Gas	659.6	765.2	741.8	711.4	740.0	748.9
	Coal	718.4	784.2	880.8	856.8	888.1	915.4
	Electricity	77.9	142.1	200.7	209.6	217.6	228.0
	Total	2 887.9	3 356.8	3 316.3	3 302.6	3 381.3	3 488.4
Eastern Europe and the USSR	Oil	271.1	465.7	437.0	447.3	457.9	466.4
	Gas	192.2	385.6	548.3	575.8	618.2	616.9
	Coal	518.1	589.2	600.3	615.5	619.1	663.9
	Electricity	12.1	25.0	38.2	38.1	41.7	45.4
	Total	993.5	1 465.5	1 623.8	1 676.7	1 736.9	1 792.6
All developing countries	Oil	267.1	554.5	611.5	629.9	646.5	683.2
	Gas	49.6	131.9	182.0	201.9	227.4	245.0
	Coal	270.5	463.2	644.7	680.2	710.6	729.8
	Electricity	16.8	42.4	60.5	63.4	66.5	69.6
	Total	604.0	1 192.0	1 498.7	1 575.4	1 651.0	1 727.6
Member countries of OPEC	Oil	37.6	110.6	150.0	148.3	146.3	152.4
	Gas	24.2	57.6	81.4	98.0	105.4	117.4
	Coal	1.0	1.6	2.6	3.4	4.1	3.7
	Electricity	0.8	2.4	3.6	3.8	4.0	4.1
	Total	63.6	172.2	237.6	253.5	259.8	277.6
Other oil-exporting countries	Oil	70.0	163.6	192.1	198.6	208.8	215.6
	Gas	16.8	50.0	59.6	58.8	63.2	64.9
	Coal	179.8	310.3	427.7	449.2	468.0	476.6
	Electricity	4.9	10.3	15.2	15.2	15.6	16.7
	Total	271.5	534.2	694.6	721.8	755.6	773.8
Oil-importing countries	Oil	159.5	280.3	269.4	283.0	291.4	315.2
	Gas	8.6	24.3	41.0	45.1	58.8	62.7
	Coal	89.7	151.3	214.4	227.6	238.5	249.5
	Electricity	11.1	29.7	41.7	44.4	46.9	48.8
	Total	268.9	485.6	566.5	600.1	635.6	676.2
Total world	Oil	1 970.2	2 685.5	2 541.5	2 602.0	2 640.0	2 745.7
	Gas	901.4	1 282.7	1 472.1	1 489.1	1 585.6	1 610.8
	Coal	1 507.0	1 836.6	2 125.8	2 152.5	2 217.8	2 309.1
	Electricity	106.8	209.5	299.4	311.1	325.8	343.0
	Total	4 485.4	6 014.3	6 438.8	6 554.7	6 769.2	7 008.6

Source: Department of International Economic and Social Affairs of the United Nations Secretariat, based on the Energy Statistics Yearbook, various issues.

a/ Data on oil consumption refer to "apparent consumption", which is an indication of actual gross inland availability. They do not include air and sea bunkers or non-energy products from refineries.

Table 3. Composition of commercial primary energy consumption by source

(Percentage)

		1970	1980	1985	1986	1987	1988
Developed market economies	Oil	49.6	49.6	45.0	46.2	45.4	45.8
	Gas	22.8	22.8	22.4	21.5	21.9	21.5
	Coal	24.9	23.4	26.6	25.9	26.3	26.2
	Electricity	2.7	4.2	6.1	6.3	6.4	6.5
Eastern Europe and the USSR	Oil	27.3	31.8	26.9	26.7	26.4	26.0
	Gas	19.3	26.3	33.8	34.3	35.6	34.4
	Coal	52.1	40.2	37.0	36.7	35.6	37.0
	Electricity	1.2	1.7	2.4	2.3	2.4	2.5
All developing countries	Oil	44.2	46.5	40.8	40.0	39.2	39.5
	Gas	8.2	11.1	12.1	12.8	13.8	14.2
	Coal	44.8	38.9	43.0	43.2	43.0	42.2
	Electricity	2.8	3.6	4.0	4.0	4.0	4.0
Member countries of OPEC	Oil	59.1	64.2	63.1	58.5	56.3	54.9
	Gas	38.1	33.4	34.3	38.7	40.6	42.3
	Coal	1.6	0.9	1.1	1.3	1.6	1.3
	Electricity	1.3	1.4	1.5	1.5	1.5	1.5
Other oil-exporting countries	Oil	25.8	30.6	27.7	27.5	27.6	27.9
	Gas	6.2	9.4	8.6	8.1	8.4	8.4
	Coal	66.2	58.1	61.6	62.2	61.9	61.6
	Electricity	1.8	1.9	2.2	2.1	2.1	2.2
Oil-importing countries	Oil	59.3	57.7	47.6	47.2	45.8	46.6
	Gas	3.2	5.0	7.2	7.5	9.3	9.3
	Coal	33.4	31.2	37.8	37.9	37.5	36.9
	Electricity	4.1	6.1	7.4	7.4	7.4	7.2
Total world	Oil	43.9	44.7	39.5	39.7	39.0	39.2
	Gas	20.1	21.3	22.9	22.7	23.4	23.0
	Coal	33.6	30.5	33.0	32.8	32.8	32.9
	Electricity	2.4	3.5	4.6	4.7	4.8	4.9

Source: Department of International Economic and Social Affairs of the United Nations Secretariat, based on the Energy Statistics Yearbook, various issues.